

Appl. No. : 10/664,699
Filed : September 18, 2003

REMARKS

Claims 1, 2, 4 and 6-16 Are Patentable Over The Applied Reference

Claims 1, 4, 6-10 and 14-15 stand rejected as anticipated by Bernd. Claim 2 stands rejected as unpatentable over Bernd in view of Leuschmer et al. Claims 11-13 and 16 stand rejected as unpatentable over Bernd in view of Alston et al. and further in view of Winter et al. Applicant submits that Bernd does not disclose the elements asserted by the Examiner and further that Bernd does not anticipate Claims 1, 4, 6-10 and 14-15. Applicant further submits that the limitations of Claims 2, 11-13 and 16 define over the applied combinations.

Enclosed with this response is a certified translation of Bernd. Bernd disclosed a space heater in the form of a load bearing radiator structure. The reference explains that the inventive load bearing radiator structure is usually attached to the normal heating system of a building like any other radiator.

In the arrangement shown in Figure 1 of Bernd, a heating rod 26 is positioned within each of the heating tubes 16, which defines a radiant space heater construction that does not use heated water and that does not heat water. In the arrangement shown in Figure 2 of Bernd, hot water is passed through the heating tubes 16, which hot water is supplied by the hot water system of the building and returned to the hot water system of the building. Bernd specifically discloses that the heating tubes define a closed base frame within which a continuous-flow heater can be accommodated, which continuous-flow heater can be used to generate hot water for use in a water basin while being hidden from view of the user. Similarly, the heating element 14 shown in Figure 3 of Bernd is operated using hot water, which is supplied from and returned to the hot water system of the building. The arrangement of Figure 4 is a combination of the arrangement of Figure 3 (tubes 16 carrying water heated by the building hot water system) and the arrangement of Figure 1 (heating rods 26 are positioned within heating tubes 50 but without water flowing through the heating tubes). "The heating tubes 50 get heated if the hot water heating system of the building is out of operation." The remaining portion of the application describes the use of radiators to support windows and tables. None of the embodiments disclosed, taught or suggested forming a water basin support from a water heater, where the water heater supplies water to the water basin.

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Thus, the translation makes apparent that Bernd failed to disclose that which the Examiner argues the reference disclosed. The structures disclosed by Bernd are not water heaters; the structures are heat radiators and the water passing through the tubes does not pass on to the sink. Moreover, contrary to the Examiner's comment, the abstract does not disclose a heater 50 positioned exterior to the tube 16 such that deposits do not form on the heater 50. Rather, the abstract states: "Electrically heated heating segments (50) are attached to the heating segments (16) heated by hot water, running at a distance from and parallel to them." As explained above, the electrically heated heating segments 50 are only heated if the hot water heating system of the building is out of operation.

Claim 1 recites, among other limitations, a water heating apparatus for use with a wash basin on an aircraft. The length of a tube along which an electric heater extends defining a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water. None of these limitations is disclosed, taught or suggested by Bernd. As explained above, Bernd did not disclose a water heating apparatus that heated water in coils, which water was used in the wash basin. The electric heaters were used to heat the surrounding room only when the hot water supply system of the building was not operational. For at least these reasons, Claim 1 is not anticipated.

Claims 2, 4 and 6-13 depend from Claim 1. None of these claims is anticipated for at least the same reasons that Claim 1 is not anticipated. Moreover, the applied combinations are based primarily upon Bernd and the secondary references do not supply the teachings missing from Bernd. Therefore, Claims 2, 4 and 6-13 are patentable over Bernd and the applied combinations.

Claim 14 recites, among other limitations, a method of heating small volumes of water for intermittent usage. The method comprises providing a tube to be connected to a water outlet. The method also comprises providing an electric heater that is in contact with a tube containing water over a length that defines a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply

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of heated water. Again, none of these limitations was disclosed by Bernd. Thus, for at least these reasons, Claim 14 is not anticipated.

Claims 15 and 16 depend from Claim 14. The applied combinations used to reject Claims 15 and 16 also fail to teach or suggest the limitations discussed above. Thus, Claims 15 and 16 are patentable over Bernd and the applied combinations.

New Claims 17 and 18 each depends from Claims 1 and 14. These claims add limitations relating to the outlet of the tube. As explained above, the water flowing through the heating tubes is connected only to the hot water supply system of a building – the water is not emptied into the water basin. Consideration and allowance of these claims also is requested.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, issuance of a Notice of Allowance is most earnestly solicited.

The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve such issue promptly.

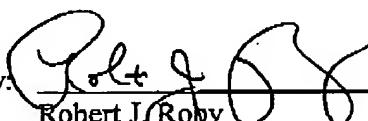
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Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 9.7.2005

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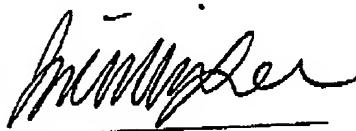


**TRANSPERFECT
TRANSLATIONS**

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I, Jimmin Lee, hereby certify that the following is, to the best of my knowledge and belief, a true and accurate translation of the document, "Published Unexamined Patent Document DE 3823281," from German into English.

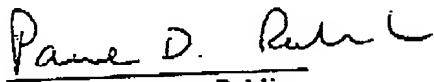
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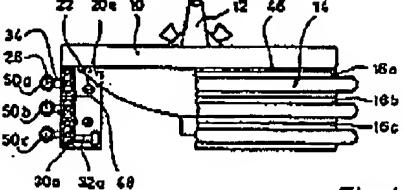
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(54) Heating Element A heating element (14) has a plurality of identically bent heating segments (16) arranged in alignment one behind the other and mechanically interconnected (48). Electrically heated heating segments (50) are attached to the heating segments (16) heated by hot water, running at a distance from and parallel to them. The loadable supporting structure formed by the heating segments may be used, for example, to carry a washbasin (10).	 Fig. 4
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Description

The invention relates to a heating element with a plurality of mechanically interconnected heating segments.

Such heating elements are available on the market in the form of radiators, convectors and plate radiators. They have a plurality of mechanically interconnected heating segments heated by electricity or hot water, so that the heating element can be handled altogether as a single piece component. These heating elements are usually attached to the brickwork using special anchorage or they stand on feet on the floor of a room. However, such standard heating elements must not be loaded mechanically.

For some applications it would be advantageous, if a heating element can be used at the same time as a support structure for objects of equipment, e.g., for carrying wash basins, table tops, windowsills or the like. This would be advantageous, particularly in small rooms with less space available for setting up heating elements. The heating function could then be integrated into the support structures that are required anyway for attaching objects in the room.

A heating element is created by the present invention, which can be used at the same time as a support structure for objects of equipment.

This is achieved due to the fact that the individual heating segments are substantially identically bent, arranged in alignment one behind the other and interconnected to form a loadable support structure.

A heating element according to the invention has high load capacity since the individual heating segments are bent. Thus contrary to purely plate-shaped heating segments, each heating segment has a relatively large moment of inertia of an area and can thus resist deformations. The arrangement of several heating segments of substantially identical form one behind the other enables the creation of a mechanically highly loadable support structure using mechanically less expenditure, by interconnecting e.g., the heating segments arranged one behind the other using short rod-shaped reinforcing elements at distances to form a framework or by connecting the bent heating segments at selected places to a flat reinforcing element, which runs parallel to the arrangement of heating segments. A corresponding embodiment of the invention is specified in claim 2.

In the embodiment of the invention in accordance with claim 3, the exterior surface of the arrangement of heating segments is substantially continuous, so that it can be cleaned with particular ease.

The embodiment of the invention in accordance with claim 4 is advantageous with regard to a particularly simple and low-priced connection of the adjoining heating segments. Here, the heating segments need to be connected only in selected areas of the joints using short welding seams. Also the heating element according to claim 4 has a substantially continuous exterior surface, which again is advantageous with respect to easy cleaning. Furthermore, the space behind the arrangement of heating segments is hidden from the view of the observer, so that technical installations of lesser visual appeal can be inserted there.

Usually a heating element according to the invention is attached to the normal heating system of a building just like a normal heating element that is intended only for heating purposes. However, this heating system is out of operation during the summer months. Particularly for the use in bathrooms, it is desirable if the room can be heated in the summer months even when the heating equipment is not working.

In a heating element in accordance with claim 5, this supplementary heating system can be integrated for the summer months using less additional expenditure and practically without any additional space requirement into the heating element carrying an object of equipment that is already provided.

The embodiment of the invention in accordance with claim 6 is advantageous with regard to a simple attachment of objects of equipment.

In the embodiment of the invention in accordance with claim 7, the objects of equipment can be located flat against the heating element even if the supporting surface of the heating element and/or the arrangement of the heating element and the supporting surface of the object of equipment interacting with it are not exactly even.

In the embodiment of the invention in accordance with claim 8 the appearance of the heating element is not worsened despite a separate external pipe or by a separate external pipeline. This also simplifies the installation of the heating element.

In the following description the present invention is explained more elaborately on the basis of the

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embodiments and with reference to the drawing, of which:

Fig. 1 illustrates a top view of a washbasin, which is carried by a mechanically loadable tubular heating element, which is illustrated as partially broken;

Fig. 2 illustrates a similar view as illustrated in Fig. 1, in which, however, the heating element carrying the washbasin is designed as a base frame standing on the floor;

Fig. 3 illustrates a similar view as illustrated in Fig. 1, in which, however, the heating element is heated using hot water and is assembled from heating tubes having a rectangular cross-section; Fig. 4 illustrates a similar view as illustrated in Fig. 1, where, however, the heating element consists of rectangular hot water heating tubes connected to one another at joints and electrical heating tubes placed on them;

Fig. 5 illustrates the view of a window, whose window sill is carried by an arrangement of heating elements that are bent in a U-shape; and Fig. 6 illustrates a perspective view of a table, whose foot is also formed by a heating element bent in a U-shape.

Fig. 1 illustrates a washbasin 10 with a mixing faucet 12. The washbasin 10 is carried by a heating element marked as 14, which is arranged underneath the edge of the washbasin aligning with 14 and which supports the edge of the washbasin from below.

The heating element 14 has three heating tubes 16a, 16b, 16c arranged at a vertical distance from one another, which are bent according to the outline of the edge of the wash basin 10, e.g., in the form of three sides of a rectangle or in a semi-circular form. The ends of the heating tubes 16 are fixedly attached to mounting plates 20a, 20b, which are fastened to a building wall by means of screws 22.

The mounting plates 20 project slightly over the uppermost heating pipe 16a, just like reinforcing plates 24, which are fixedly connected with the heating tubes successively at a distance from one another and in the longitudinal direction of the heating tubes 16. The reinforcing plates 24 can have e.g., passage openings, which accommodate the individual heating tubes 16, where the heating tubes 16 are welded to these passage openings. The heating tubes 16, the mounting plates 20 and the reinforcing plates 24 thus form a mechanically highly loadable framework, which can even carry a heavy washbasin 10 without any problems.

Fig. 1 illustrates the heating rods 26 in the interior of the heating tubes 16, which are

connected to a plug socket by a mains cable 28. The heating rods 26 are bent corresponding to the bending of the heating tubes 16 and extend through the heating tubes 16. In the embodiment illustrated it is assumed that that the heating rods 26 are folded heating rods, so that both connections of the heating rods 26 lie behind the mounting plate 20a and all connection points of the heating rods 26 behind the mounting plate 20a can be connected to the mains cable 28.

If instead of that, heating rods 26 are used, whose connections are distributed on the rod ends, a mechanically equivalent additional tube can be provided below the heating tube 16c in addition to the heating tubes 16, in which a conductor connecting the two ends of the heating rods 26 is led back to the mounting plate 20a.

It can be seen that the heating element illustrated in fig. 1, in case of the usual dimensions of a washbasin, has the dimensions required by a heating element to heat a small bath. However, the heating element illustrated in fig. 1 needs no additional supporting surface. It also generates the heat at the place where it is needed the most. The heating element 14 also maintains the temperature of the washbasin 10. Also it is simpler to mount the objects of equipment of the bath, since the attachment of the washbasin and the mounting of the heating element can be accomplished in one operation.

In the modified embodiment according to fig. 2 the parts, which were specified above with reference to fig. 1, have been provided with the same reference symbols.

However, the heating tubes 16a to 16g are now heating tubes through which the hot water flows and that are connected at their ends by head pieces 30a, 30b. These carry ports 32a, 32b for the connection to the hot water heating system of the building.

Here the heating tubes 16 are connected by a plurality of reinforcing rods 34 arranged in the longitudinal direction and at a distance to a continuous reinforcing wall 36 made out of sheet metal. The reinforcing wall has at its upper end an overturned support flange 38 that supports the edge of the washbasin 10 from below and an overturned stand flange 40 at the lower end that is seated on a base plate 42 of the heating element.

On the basis of this embodiment of the heating element, the wash basin 10 can be arranged so that it stands freely in the room or in front of a wall that does not have the mechanical strength that would have been necessary for attaching a wash basin. The heating element illustrated in

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fig. 14 also forms a closed base frame in which technical equipment such as a continuous-flow heater 44 can be accommodated for the generation of hot washwater while at the same time being hidden from the view of the observer. The heating element 14 illustrated in fig. 2 also has a very large heating surface and is also sufficient for heating larger baths.

Even the heating element 14 illustrated in fig. 3 is operated using hot water. The individual heating tubes have a rectangular cross-section and lie over one another at a distance from one another and are connected by vertical reinforcing plates 24. Thus it is possible to achieve a visually appealing and mechanically loadable design of a heating element with a smooth and continuous exterior.

In order to be able to better adjust any unevenness in the lower surface of the edge of the wash basin and the upper side of the heating element 14, a support 46 manufactured from flexible plastic is inserted between the upper side of the heating element 14 and the lower surface of the wash basin 10. In all other respects, the parts of the heating element specified above with reference to fig. 1 and fig. 2 are provided with the same reference symbols in fig. 3.

The basic structure of the heating element illustrated in fig. 4 that can be used as a mounting plate for a washbasin, largely resembles that of the heating element illustrated in fig. 3. Only the individual heating tubes 16 having a rectangular cross-section are now arranged on joints and are connected fixedly by means of welding seams 48 at the joints. The welding seams extend at different places along the longitudinal direction of the tube over a small stretch of a few centimeters. Additional heating tubes 50a, 50b and 50c having a circular cross-section are placed on the continuous basic structure thus obtained by using reinforcing rods 34, as described with reference to fig. 2 for the fixed connection between the heating tubes 16 and the reinforcing wall 36 manufactured from sheet metal. The heating tubes 50 are provided in turn with heating rods 26 and in this respect resemble the heating tubes illustrated in fig. 1. The heating tubes 50 get heated if the hot water heating system of the building is out of operation. The heat is generated at the place where it is needed the most.

In the embodiments described above, one of the even side surfaces of the heating element was the supporting surface for a washbasin. Instead of that, the outer surface of the side or the base can also be used as the support surface for an object

of equipment as has been specified in figures 5 and 6.

In fig. 5 a plurality of U-shaped bent heating elements 14 are illustrated whose sidepieces are attached to the floor area of a room and are connected there also to the supply pipe and the return pipe of the hot water heating system of the building. The different heating segments 16 of the heating element 14 are arranged vertically to the drawing plane of fig. 5 one behind the other, unless if arranged at a distance as is the case in figure 3, or unless aligned to be flush with one another as is the case in fig. 4.

This arrangement of heating elements is visually appealing and light. In case of the windowpane pulled down to the floor of the room, this heating element arrangement considerably blocks the view toward the outside.

The highest points of the exterior surface of the heating elements 14 carry supports 52 that have a concave bent lower boundary surface and an even upper boundary surface. The supports 52 are manufactured from a somewhat flexible plastic material and provide a horizontal support surface for a windowsill 54 that is arranged in front of the glass pane 56 stretching from the ceiling up to the floor of the room. The windowsill 54 is supported so reliably that even persons can be seated on the windowsill 54. Thus on the whole, the present invention enables the creation of an appealing, easy support structure for the windowsill 54 that is stable and enables the heat emission in the conventional manner at the window of the room.

In a modification of the embodiment illustrated in fig. 5 the heating elements 14 can also be provided with such a low height that a board placed over it can be used directly as a bench. It is also possible to select the shape of the heating element 14 in such a manner that the side connection section or the base section is substantially straight-lined and only the transition areas between the base section of the U and the sides of the U are rounded off. Then every heating element 14 can be a heated stool firmly installed in front of the window.

Fig. 6 illustrates such a rectangular-U-shaped heating element 14 similar to a cubic block. This heating element is now used as a foot base for a glass plate 58. The heating element 14 illustrated in fig. 6 forms together with the glass plate 58 a table firmly installed in the room where the heating element 14 releases heat in places where it would be felt as being most pleasant by persons seated there especially during the cold season, namely in the vicinity of the feet and in

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the area of the hands. A table as illustrated in fig. 6 is particularly suitable for waiting rooms or restaurants with a very high room height as is the case sometimes in railway stations and at airports. Since the heat is preferably generated by using a table according to fig. 6 in places where it is really needed, it is also possible to avoid the frequent overheating of such rooms.

Claims

1. Heating element with a plurality of mechanically interconnected heating segments, characterized in that the heating segments (16) are substantially identically bent, and arranged in alignment one behind another to form a loadable support structure (24; 34; 36; 48).
2. Heating element pursuant to claim 1, characterized in that the heating segments (16) are designed as bent heating tubes, which are interconnected at distances by a plurality of reinforcing elements (24) extending successively in the longitudinal direction of the tube or are connected (34) at distances to a bent flat reinforcing element (36) running parallel to the heating segment arrangement.
3. Heating element pursuant to claim 1 or 2, characterized in that the heating segments (16) have a rectangular cross section.
4. Heating element pursuant to claim 3, characterized in that the heating segments (16) lie against one another with their front surfaces facing one another.
5. Heating element according to any of the claims 1 to 4, characterized in that it has a second set of heating segments (50), which extend at a distance from and parallel to the first heating segments (16) and are fixedly connected with the arrangement of the first heating segments (16) and that the second heating segments (50) are heated by a heating medium, which differs from the heating medium supplied to the first heating segments (16).
6. Heating element pursuant to any of the claims 1 to 5, characterized in that it forms by itself or together with one or more adjoining heating elements (14) a

free supporting surface that is independent of the mounting surface.

7. Heating element pursuant to claim 6, characterized in an elastically and/or plastically ductile leveling layer (46; 52) arranged on the supporting surface.
8. Heating element pursuant to any of the claims 1 to 7, characterized in that, the ends of the heating segments (16) arranged in alignment one behind the other are connected by the head pieces (30) distributing the heating medium and connections (32) for supplying and discharging the heating medium are provided at the same ends of the head pieces (30).

3 page(s) of drawings
